


Commercial & Industrial Building Energy Code Baseline Study



National Codes Conference

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and

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07/12/00

Background Issues



- ⌘ Feedback on Residential Energy Codes Workshop
- ⌘ Limitations on Compliance Process
- ⌘ Lack of adequate knowledge of the issues to address on C&I codes
- ⌘ Decision to Investigate, Diagnose, and Administer Solutions

Preliminary Evaluations



- ⌘ Feedback from Building Officials
- ⌘ Feedback from Architects invited to a Focus Group Discussion
- ⌘ Low Incidence of Permit Applications at the PUC

Strategies to Accomplish Goals & Objectives



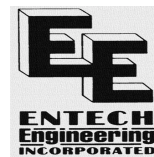
- ⌘ Goals & Objectives Established
- ⌘ Requirements to Achieving G & O
- ⌘ Available Funds
- ⌘ Solicit Contributions and Participation from other Stakeholders
- ⌘ How to Accomplish as much with limited funds

Survey of Commercial New Construction Activities in NH



GDS Associates and
ENTECH Engineering

July 12, 2000



Overview



- ⌘ The GDS/Entech Team
- ⌘ Summary of Findings
- ⌘ Methodology
- ⌘ Data Collection Results
- ⌘ Recommendations and Next Steps
- ⌘ Conclusions

The GDS/Entech Team



⌘ GDS Associates - Prime Contractor

⌘ Entech Engineering - Subcontractor

⌘ Significant Field and Policy Experience

Summary of Findings:

Code Utilization and Compliance



- ⌘ Building Code Officials rely almost solely on architect/design engineer certifications
- ⌘ Design Professionals are not testing for compliance when developing plans/specs
- ⌘ Additional training is needed targeted to designers, contractors & code officials

Summary of Findings: Measure Specific



- ⌘ Technology has surpassed current NH code requirements in many areas
- ⌘ Nearly half of facilities reviewed, met or exceeded code in all major categories (i.e., Building Envelope, HVAC - Heating, HVAC - Cooling, Electric Power/Motors, Lighting Fixtures, and Energy Management Systems)

Methodology



- ⌘ C/I New Construction Profile (1997-1999)
- ⌘ Plans & Print Reviews (30 buildings)
- ⌘ Physical Site Inspections (12 facilities)
- ⌘ Equipment Supplier/Design Engineer, and Building Official Interviews (16 surveys)
- ⌘ Review of Existing Studies (20 reports)
- ⌘ Tentative Findings & Roundtables

Data Collection Results

1999 CONSTRUCTION ACTIVITY BY COUNTY & HIGHEST TOWN

County/Town	# of Projects	
	<u>Town</u>	<u>Total</u>
Belknap - Laconia	15	41
Carroll - Conway/N. Conway	17	44
Cheshire - Keene	63	99
Coos - Berlin	7	23
Grafton - Lebanon/W. Lebanon	39	109
Hillsborough - Manchester	187	512
Merrimack - Concord	112	183
Rockingham - Portsmouth	100	369
Strafford - Rochester	45	142
Sullivan - Claremont	<u>11</u>	<u>31</u>
Total	596	1,553

Construction Profile Results

1999 CONSTRUCTION ACTIVITY BY COUNTY & BUILDING SIZE*

County	Small (< 20,000 sq. ft.)	Large (>=20,000 sq. ft.)
Belknap	2	4
Carroll	6	2
Cheshire	8	14
Coos	1	2
Grafton	21	18
Hillsborough	63	63
Merrimack	27	20
Rockingham	60	63
Strafford	23	10
Sullivan	6	3
Total	217	199

* Note: Information on building size was not available on all projects identified in the 1999 commercial and industrial construction activities profile database.

Construction Profile

Results - continued

1999 CONSTRUCTION ACTIVITY BY COUNTY & BUILDING TYPE*

County	Assembly	Hospital	Housing	Manuf- acturing	Office	Retail	School	Warehouse
Belknap	5	-	4	4	3	3	7	-
Carroll	10	-	8	-	2	7	5	2
Cheshire	16	4	6	3	11	12	8	9
Coos	8	-	1	-	2	2	5	-
Grafton	21	6	12	3	30	11	16	2
Hillsborough	55	9	35	16	94	73	57	21
Merrimack	29	2	16	4	25	27	16	9
Rockingham	50	8	34	14	57	59	23	29
Strafford	24	4	13	6	12	8	16	7
Sullivan	<u>6</u>	<u>-</u>	<u>3</u>	<u>1</u>	<u>6</u>	<u>3</u>	<u>-</u>	<u>1</u>
Total	224	33	132	51	242	205	153	80

* Note: information on building type was not available on all projects identified in the 1999 commercial and industrial construction activities profile database.

Premium, Standard and Code Efficiency Practices



- ⌘ Cornerstone of this research project
- ⌘ Covers building envelope, electric power, HVAC equipment, service water heating, lighting fixtures, lighting controls, and energy management system measures
- ⌘ Initially based on secondary data sources
- ⌘ Tested and revised during interviews, site visits and roundtables

Measure-Specific Results

Equipment or Building Practice Addressed in NH Commercial Energy Code	Summary of Findings from Plans and Prints Reviewed and Sites Inspected
Building Envelope	Most measures and practices were in compliance
HVAC - Heating	All unit efficiencies exceeded code
HVAC - Cooling	53% exceeded code/27% met/20% below code
Electric Power/Motors	All exceeded code
Lighting Fixtures	Generally exceeded code
Lighting Controls	Specified very infrequently
Energy Management Systems	Found in most facilities sampled, although sophistication varied by size (mostly overridden to solve immediate comfort problems)
Service Water Systems	24% did not meet code insulation requirements
Energy Recovery Practices/Energy Storage	Not seen in facilities reviewed

Recommendations



⌘ Near-Term Actions

- ☑ Communicate findings and pursue training
- ☑ Integrate code with available software tools

⌘ Mid-Term Actions

- ☑ Use findings to help prioritize potential follow-up initiatives and to aid in design of targeted energy efficiency programs

⌘ Longer-Term Actions

- ☑ Consider updating and clarifying energy code

Conclusions



- ⌘ Valuable approach to assess status quo
- ⌘ Increases awareness and engages key stakeholders and change agents
- ⌘ Promotes constructive dialogue between building code officials, architects/design engineers, equipment vendors, utilities and their regulators
- ⌘ Provides solid foundation/rationale for energy code updates